

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 1, 5, 8-12 are amended. Claims 2-4 and 6-7 are cancelled. Support for the amendments can be found throughout the Specification, for example in Paragraphs [0035] - [0040] and [0044], and Figures 1 - 3. No new matter is added.

After amending the claims as set forth above, claims 1, 5, 8-12 are now pending in this application.

Drawing Objections

The drawings are objected to under 37 CFR 1.83(a) for not showing all features of the invention specified in the claims. Reference character (e.g., 132l, 132g, etc.) have been assigned to pump features disclosed in the Specification and/or recited in original claims. Paragraphs [0026] and [0028]-[0030] of the Specification are amended accordingly. No new matter is added.

The drawings are also objected to under 37 CFR 1.84(p)(4) for not showing all features of the invention specified in the claims, and for reference character “6” being used to designate both “gas introduction port” and “bearing member”. Paragraph [0035] is amended for clarification. Support for the amendment can be found in Figure 1, which shows that the screw rotors 13M and 13FM are closed at end portions thereof, for example at the closed portions 131. No new matter is added.

By way of this Reply, the drawing objections are now moot.

Specification Objections

The Specification is objected for formalities of Abstract and Title.

The Title is amended to recite “VACUUM PUMP HAVING SHAFT SEAL TO PREVENT CORROSION AND TO ENSURE SMOOTH OPERATION”.

A new Abstract is attached to this document to replace the previously submitted Abstract, as requested. The Abstract is now a single paragraph within the range of 50-150 words.

By way of this Reply, the Abstract objections are now moot.

Claim Rejections under 35 U. S. C. § 112

Claims 1 and 12 are rejected under 35 U.S.C. 112, second paragraph.

Claims 1 and 12 are amendment without prejudice. By way of this Reply, the section 112 are now moot.

Claim Rejections under 35 U. S. C. § 103

Claims 1-3 and 6-7 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Dahmols (US 5,924,855) in view of Kaneto (JP 61-043298). Claims 4-5 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Dahmols in view of Kaneto and further in view of Honma (JP 2001-056027). Claims 8-10 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Dahmols in view of Kaneto and further in view of legal precedent. Claim 11 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Dahmols in view of Kaneto and further in view of Schofield (US 6200116). Claim 12 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Dahmols in view of Kaneto and further in view of design choice.

Independent claim 1 is amended without prejudice. It now recites the shaft seal structure (17) comprises the shaft seal members (8), which are circumferentially attached to the outer circumferential surfaces of the bearing members (16M, 16FM), respectively. Each of the shaft seal members (8) is porous. A seal gas can be introduced to gaps between the outer circumferential surfaces of the bearing members (16M, 16FM) and inner circumferential surfaces of the screw rotors (13M, 13FM) from all of outer circumferential

surfaces of the shaft seal member (8). The shaft seal structure (17) forms a static pressure seal so that the screw rotors (13M, 13FM) are centered with respect to the axes (X_M , X_{FM}) without runout (or tilt), respectively. Furthermore, the inner circumferential surfaces of the screw rotors (13M, 13FM) are *not* in contact with the shaft seal members (8). As explicitly explained in Paragraphs [0039] and [0023]-[0024] and indirectly referred to in Paragraph [0044], one advantage of the claimed invention is that the consumption amount of seal gas can be largely reduced due to a smooth operation of the screw rotors of the invention. Second, the ultimate pressure of the vacuum chamber can be reduced, because a faster pumping speed is made possible by faster rotations of the screw rotors of the instant invention. Further, an uniform pumping speed can be maintained even in the low inlet pressure region. Thus, in a system comprising multiple vacuum pumps connected in a plurality of stages, it is possible to omit one or more pumps (i.e., a turbomolecular pump) at the stage prior to the claimed vacuum pump.

In contrast, Kaneto's seal structure only introduces the seal gas from a second discharge port, which is a single point in both of the rotor axis direction (i.e., longitudinal direction) and bearing circumferential direction. Inherently, Kaneto's screw rotor cannot be centered with respect to the rotor axis without runout (or tilt).

Honma teaches a porous member. However, the porous member of Honma is a plate, in contrast to claim 1. Furthermore, throughout Honma, it is silent regarding a porous member having a hollow-cylindrical shape or any shape other than a plate.

Thus, Kaneto and Honma, either alone or combined, fails to teach a shaft seal having cylindrical shape for introducing a seal gas from all of outer circumferential surface thereof, as recited in claim 1.

Dahmlos and Schofield are cited for disclosing other features of claims, but fail to cure the deficiencies of Kaneto and Honma explained above.

Claims 5 and 8-12 depend from claim 1, and thus are patentable for at least the same reasons as claim 1.

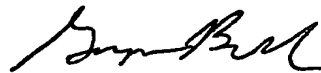
Conclusion

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,



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By _____

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